

May 1891.

*Cluster 44 M. Cancrī.*

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changes having taken place in the object between October 15, 1890, when observed at Lick, and December 9, when the photograph was taken. I am sending a copy of the photograph to Mr. Burnham, with the object of assisting to clear up what is now obscure.

The position of the nebula and of Hind's variable (R.A.  $4^{\text{h}} 14^{\text{m}} 58^{\text{s}}$ ,  $D + 19^{\circ} 14'$ ) is indicated within the larger of the white circles drawn on the photograph, and within the smaller white circle is the planet *Neptune* shown with its satellite.

The satellite is very strongly imprinted on the film of the negative as a black spot, and this is itself an indication of the faintness of the luminosity required to make an impression on the photograph.

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*Photograph of the cluster 44 M. Cancrī (the Præsepe).* By Isaac Roberts, F.R.S.

The photograph now presented is an enlargement to three and a half times from a negative which was taken on February 13, 1891, and is intended to serve as a chart of the stars between R.A.  $8^{\text{h}} 30^{\text{m}}$  and  $8^{\text{h}} 38^{\text{m}}$ , declination N.  $19^{\circ} 19'$  to  $21^{\circ} 19'$ , covering four square degrees of the sky. The exposure was given during ninety minutes in the 20-in. reflector. The negative shows many faint stars that cannot be copied on the enlarged photograph, and I propose to engrave (direct from the negative) this and some other clusters, as illustrations of the advantage of the engraving process over the photographic in showing all the stars, including the faintest, that may be on any negative and in eliminating from the chart specks on the film that would in any photo-printing process appear as, and be mistaken for, stars.

The photographs illustrating the above three communications are placed in the Library.

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*On the character of the chief line of the Nebula in Orion.*

By Kavasgee D. Naegamvala, M.A.

Mr. Lockyer bases the claim of the chief nebula line to belong to magnesium, on the ground first that according to his observations it is exactly coincident with the first magnesium fluting, and secondly that it has the character not only of the remnant of a fluting, but of the fluting of magnesium, inasmuch as the line has been observed by him and by others to be *less* well defined on the violet side than on the red.

The recent researches of Dr. and Mrs. Huggins, followed by those of Mr. Keeler, have shown that the claim of perfect coincidence with the first magnesium fluting advanced by Mr. Lockyer for the chief nebula line is not tenable, while the fluted character of the line itself has been very much called in question of late.

Mr. Lockyer in his "Meteoritic Hypothesis" states that "observations of nebulae should show that a fluting and not a line is in question," and as for instrumental means to be employed for this particular purpose he remarks that "high dispersion is not so likely to show the fluted character of the chief line as low."

I have therefore felt that the instrumental means at my disposal were well suited for a determination of the *character* of the line in question, and I have with that view examined the *Orion* nebula on numerous occasions during the last two months.

The telescope employed has been a silver-on-glass Newtonian by Sir Howard Grubb of  $16\frac{1}{2}$ -inch aperture, while three different spectroscopes have been successively brought to bear upon the nebula. The first one employed was a direct-vision McClean Spectroscope, by Browning, with a slit opening only in one direction; while the second instrument was a rain-band spectroscope by Negretti and Zambra, provided with an eye-piece and easily, though not very widely, separating the D line; the slit of this spectroscope was also made to open only in one direction. The third spectroscope was a star single prism spectroscope by Grubb of his well-known form, with this difference, that, instead of the usual compound prism, a large prism of flint was substituted; the lenses of this spectroscope are an inch and a half in diameter, the telescope is provided with a battery of four eye-pieces, and the slit opens equally in both directions. The instrument gives spectra of exceptional brilliancy and of great definition.

Neither of the three spectroscopes has revealed any "fluted" characteristics in the chief line. On several occasions the line was observed not only well defined but *very sharp* and clear cut, having all the characteristics of a line proper; while any want of definition or clearness—in other words, the existence of any